

project WEB

spring
2004

Connecting Projects WILD, WET and Learning Tree in New Hampshire

Water, Water Everywhere!

If you ask a visitor what drew them to New Hampshire, chances are they'll talk about our majestic mountains, our historic villages, or our abundant forests. What many may not realize, however, is the wealth of wetlands that exist in New Hampshire. There's more to our small state than you may think!

Residents and tourists alike can see the headwaters of the Connecticut, Merrimack, Piscataqua, Androscoggin and Saco rivers flowing out of our mountains. They can paddle a canoe or kayak on our

more than 12,000 miles of rivers and streams, take a swim in one of our 975 lakes and ponds, or bask on the beaches on our 18 miles of coastline. But these are just the tip of the iceberg.

We hope this issue of Project WEB will open your eyes to the wealth of wetlands that we have here in New Hampshire. The resources and activities listed within will help you to broaden the horizons of your students, teaching them to look beyond the mountains, the Old Man, and the forests, and to appreciate New Hampshire's many water bodies and wetlands.

*Earth and sky,
woods and fields,
lakes and rivers, the
mountain and the
sea, are excellent
schoolmasters, and
teach some of us
more than we can
ever learn from
books.*

– John Lubbock

Wetland Waders

By Margaret Gillespie
Squam Lakes Natural Science Center

Spring, with its mixture of rainy and sunny days is perfect weather for finding wetlands. Perhaps you have had the experience of exploring in woodlands where abruptly you find yourself on squishy ground with a pool of water in front of you.

Nestled in a shallow depression with sparse vegetation on hummocks and openings in the canopy, is a *vernal pool*.

This very special kind of wetland has water in spring and early summer but is dry in the fall.

Wetlands are generally described as areas that at certain times of the year have waterlogged soils or are covered by shallow water. If you visited here



in the fall, your feet would be dry, but in the spring after snowmelt and spring runoff have filled these low-lying areas, you will be greeted with the calls of wood frogs. Soon these havens from fish predators will be teeming with tadpoles, immature salamanders with tiny gills, fairy shrimp, caddis fly larvae hidden in moving shelters they have glued together from hemlock needles and other debris, and a tiny but important source of protein for hungry creatures – mosquito larvae. At this abundant time of year,

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*Wetlands come in all
shapes and sizes.*

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Department

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another wader will visit vernal pools. Blanding's turtles travel overland in spring, protected from predators by pulling into strong shells and partially closing the plastron or lower shell with a hinge running across just behind the front legs. In a three-year telemetry study sponsored through NH Fish and Game, Blanding's turtles have been tracked traveling several miles from marshes to other feeding and nesting sites. Locating these turtles via tiny transmitters glued to the rear of their carapace, researchers have done a lot of wading themselves.

Freshwater marshes are easy to identify if you look for the soft-stemmed, emergent vegetation – cattails, reeds and rushes. Here we find one of the ultimate waders, the great blue heron. Standing like a statue, the heron moves gingerly on stalk-like legs, its long toes holding it up in the mud and its sharp eyes able to detect the movement of a fish, frog or crayfish beneath the surface. A quick strike with its sharp bill brings up a meal. Herons need marshes for food but use another kind of wetland – *swamps* – for nesting. Swamps are quickly differentiated from marshes by the presence of trees and shrubs and it is these trees that provide high perches for the herons' nests. Colonizing the area together in rookeries, herons make awkward nests out of sticks, bringing new life to the swamp with eggs hatching in June and young fledging in July.

The most impressive wader, frequenting marshes, swamps and ponds in summer, is the moose. There are several reasons for these visits. Having a large body mass, moose need a dip to cool down, with a secondary benefit of getting rid of pesky insects. While cooling, they feast on aquatic plants like pondweeds, pickerel weed, arrowheads and pond lilies, sometimes diving to plants in as much as 18 feet of water. A bulging valve in their nose closes to keep water out.

Another kind of wetland, *bogs*, do not host many waders, although black bears and white-tailed deer come in search of ripe berries in the fall. Bogs do, however, have some amazing plants that like to keep their feet wet! Facing some unusual challenges in bogs, plants have evolved special adaptations. Many bogs had their beginnings at the time of the glaciers, when giant blocks of ice were left buried and eventually melted, resulting in a wetland with little flow in and out. Lacking oxygen that



Spring is a great time to find salamanders in vernal pools.

would be introduced with incoming water, bacteria cannot do their decomposition work and so there are few nutrients available. Compounding the challenge, the dead plant material releases acids into the water. Acid-loving plants like sphagnum moss often form a floating mat of vegetation

ringing the bog. Insects beware – lurking in the moss are carnivorous plants! To get the necessary nitrogen to live in this inhospitable environment, pitcher plants and sundews capture and digest insects! Those six-legged creatures that make the mistake of looking for nectar by going down the pitcher's inviting neck or landing on the sticky red pads of the sundew have made a fatal mistake. If insects could have nightmares, being trapped in the pitcher's water by slippery sides and downward-pointing hairs, or having the sundew's gluey sides move closer would probably rank high on the scale.

Wetlands should get awards for many reasons beyond being great habitat for wildlife waders. They absorb water and so help in flood control, filter sediment from water, help neutralize pollutants, and are wonderful places for recreation. Wetlands are good neighbors indeed, regardless of whether or not you get your feet wet!



(Adapted from an article originally printed in "Tracks & Trails Newsletter". Reprinted with permission by Squam Lakes Natural Science Center. For information about the Science Center, visit its website at www.nhnature.org)

Reptile and Amphibian Reporting Program (RAARP)

RAARP is a program coordinated by N.H. Fish & Game's Nongame & Endangered Wildlife Program staff in which volunteers report sightings of reptiles and amphibians, from spring peepers to snapping turtles. Biologists use reports of the observations to determine the distribution of different reptile and amphibian species in the state. Observations help biologists identify locations of rare and endangered species that can then be targeted for conservation efforts. N.H. Fish and Game staff host meetings each spring to introduce new volunteers to RAARP and to update experienced volunteers with current and future plans.

Vernal Pool Documentation

Anyone interested in locating vernal pools in their area can get detailed guidance from the newly reprinted manual, *Identification and Documentation of Vernal Pools in New Hampshire*. The Nongame and

Endangered Wildlife Program publication provides citizens, conservation commissions and school groups with the necessary information to document local vernal pools, a first step in conserving these important habitats.

Teachers hoping to involve their classes in RAARP or the identification of vernal pools may request a copy of the RAARP information packet or vernal pool manual, by contacting staff at Fish and Game's Wildlife Division at 271-2461; or wilddiv@wildlife.state.nh.us.



**WEB Connections
for this issue:**

www.des.nh.gov/wetlands
www.nhnature.org
www.nhdfi.org/formgt/nhiweb/

Spotlight on... David Carroll

Making a Difference in New Hampshire


In each Project WEB issue, the Projects will highlight an individual or organization making a difference in New Hampshire. The winter issue focused on the Coverts Program. For the wetlands issue, there is no one more appropriate to highlight than David Carroll, wetlands author, artist, lecturer and advocate.

From the time he discovered his first turtle in the wetlands behind his Connecticut home at the age of eight, Carroll has immersed himself in swamps and the creatures that inhabit them. Through his love of turtles he met his first crush, whose gift of a *Golden Guide to Reptiles and Amphibians* showed him “a part of my life and what I lived for, a part of me, pictured and storied in a book.” Later, a high school teacher’s admonition that art is the only thing that lasts led him to the School of the Museum of Fine Arts in Boston, where he got to know the turtles of the Fenway and a beautiful young painter who would become his wife. After a brief career as an art teacher, Carroll moved his family to New Hampshire, where he has spent the past few decades studying and absorbing every aspect of the wetlands near his home from the triple viewpoint of artist, writer, and scientist.

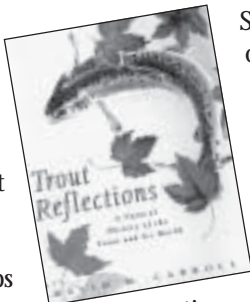
To date, David has published four books focused on wetlands and the organisms that make these areas home. The most recent of these is *Self-Portrait with Turtles, A Memoir*, released as this issue was going to print. *Self-Portrait with Turtles* is a book in the spirit of *Walden* and *Pilgrim at Tinker Creek*, but it is also unique, as David Carroll himself is. He writes about his early encounters with turtles, which led to a lifelong fascination with them and their swampy habitats. Carroll has spent decades scraping out a living as an artist and naturalist, raising three children on a shoestring with his artist wife. “We live like turtles,” he has said; “we hunker down when times get hard.” In a materialistic age, he and his family have gone their own way, living simply and self-sufficiently, showing that the secret of a good life is to devote yourself to what you love.

Each of David’s books reflect his fascination with and concern for wetland

ecosystems and the organisms that depend on these habitats for survival. *The Year of the Turtle*, *Trout Reflections* and *Swampwalker’s Journal*, known as “The Wet Sneaker Trilogy,” are compilations of drawings, field notes, and essays that bring the reader into the world of wetlands, providing an up close glimpse of these unique systems.

Additional information on David’s books and artwork is available from <http://www.davidmcarroll.com>. 

Information in this article, courtesy of Houghton Mifflin Books



David Carroll, author, artist and turtle lover.

What the State of NH is Doing to Conserve Wetlands



The federal government has had jurisdiction over wetlands since the Federal Clean Water Act became law in 1972. But did you know that New Hampshire was one of the first states in the nation to enact its own wetlands laws several years before that? In 1967, the New Hampshire wetlands law (now known as RSA 482-A) was authorized to protect these natural resources and the benefits they provide to people and the environment.

The law requires that people obtain a permit for the temporary or permanent impacts of dredge, fill, or construction in tidal and freshwater wetlands, surface waters and their banks, sand dunes, tidal buffer zone, or uplands adjacent to municipality-designated prime wetlands. (Communities can study and evaluate their wetlands, and upon town vote, designate some as prime, resulting in a higher level of protection.) The Department of Environmental Services (DES) administers this program today in coordination with the U.S. Army Corps of Engineers.

Before DES approves permits for wetlands impacts, an applicant must

demonstrate that, 1) there is a need for the impact and, 2) impacts to wetlands and surface waters have been avoided and minimized. Such permitted activities typically result in a loss of more than 125 acres of wetlands each year. To compensate for the loss of wetlands, DES now requires the creation, restoration, or enhancement of wetlands, or the preservation of upland areas that buffer wetlands, for those projects with larger impacts to wetlands. As a result of mitigation requirements applied to past projects, each year more than 1,000 acres of upland buffer areas have been protected, and about 50 acres have been created or restored.

Because the need for wetlands protection continues to grow as increased development impacts our natural resources, DES has also recently funded several research projects. These include a wetland mitigation banking feasibility study in the Ammonoosuc Valley and various studies of wetlands use by amphibians and migrating birds. For more information, visit our website at www.des.nh.gov/wetlands.



UNIQUE WETLAND COMMUNITIES

BY NEW HAMPSHIRE NATURAL HERITAGE
BUREAU, DIVISION OF FORESTS & LANDS,
DEPARTMENT OF RESOURCES AND
ECONOMIC DEVELOPMENT

Umbagog State Park – Acidic northern white cedar swamp

Acidic northern white cedar swamps occur in large, very poorly drained basins. The only water inputs are usually from precipitation and local runoff. As a result of low nutrients and low water flow, shallow to deep layers of muck and peat soils accumulate. Plants that grow under these conditions have to be tolerant of very wet soils. Mosses, especially sphagnum, are usually abundant. (*Fact sheet: Nutrient-poor Basin Swamps*)

White Mountain National Forest (west of White Horse Ledge) – Northern white cedar/ hemlock swamp

The dominant trees in the swamp are northern white cedar, with a mixture of hemlock, red maple, and white ash. Tip-overs and leaning trees are frequent, creating small but significant gaps in the canopy. Frequent canopy gaps lead to high species diversity among the plants of the forest floor, since herbaceous species that thrive in sunny spots are different from those found in shaded areas. Sweet coltsfoot (*Petasites frigidus* var. *palmaris*), a state-endangered plant, grows here, indicating that this peatland is “enriched.” For plants, this means that certain minerals they need are relatively abundant, having dissolved out of the bedrock. (*Fact sheet: Mineral-enriched Swamps*)

Ossipee Lake Natural Area – Sandy turf pond shore system

This system is composed of five natural communities: sweet gale - speckled alder shrub thicket; twig-rush sandy turf pond shore; bulblet umbrella-sedge open sandy pond shore; water lobelia aquatic sandy pond shore, and Hudsonia inland beach strand.

Sandy pond shores are a challenging place for plants to grow. Changing water

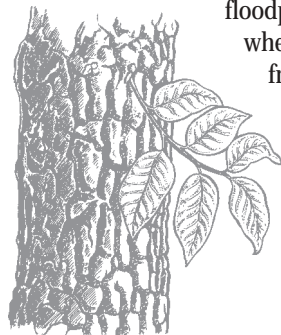
levels, wave action, and acidic, nutrient-poor soils on some shores create an unusual wetland community with species specially adapted to these difficult conditions. Many diverse and unusual plant species grow in zones along the shore, emerging and/or flowering as water levels recede. Since conditions are so variable, many species growing here practice a ‘wait for the good times’ strategy. Their hardy seeds lie dormant, or the plants wait to flower, until a particularly favorable set of conditions occurs. Then they flower and produce a new set of seeds that then may have to wait years before they in turn get to grow and flower. (*Fact sheet: Sandy Pond Shores*)

Fox State Forest – Black gum/red maple basin swamp

In New Hampshire, black gum trees are at the northern edge of their range. In our state, they are often found in fairly small, isolated, wet basins. This is a tree that does not immediately strike the eye as being impressive: trunks are rarely very big, and the crown is relatively small, with short, crooked branches. However, the oldest broadleaf deciduous tree in North America is a black gum tree growing in NH. It was found by the NH Natural Heritage Bureau and was aged at more than 679 years (by removing a thin core and counting the rings). Black gum swamps often include red maple, as well as hemlock, yellow birch, and red spruce. The water in these swamps is naturally acidic and low in nutrients, since there is usually relatively little water flow into or out of the basins. The mix of plants that occurs in the swamps is similar to that found in fens, with Sphagnum mosses and heath shrubs. This is very different from what would be found in, for example, a

floodplain forest
where river waters
frequently deposit
large amounts
of nutrient-
rich silt.

(*Fact sheet:
Nutrient-poor
Basin Swamps*)



Black gum

Manchester Cedar Swamp – Atlantic white cedar/ giant rhododendron swamp

and

Bradford Bog – Inland Atlantic white cedar swamp

Atlantic white cedar swamps are one of the rarest and most striking natural communities found in New Hampshire. This species of cedar is relatively long-lived, and individual trees may be more than 300 years old. The swamps themselves can also be very persistent: one in Antrim has been found to be present at the same site for more than 4,000 years. Conditions in the swamps support a wide variety of plant and animal species, including several that are rare in NH (e.g., the Hessel's Hairstreak butterfly, which is totally dependent on Atlantic white cedar). (*Fact sheet: Atlantic White Cedar Swamps*)

Sandy Point – Gulf of Maine salt marsh system

This system is composed of eight natural communities: high salt marsh; low salt marsh; high brackish tidal riverbank marsh; brackish marsh; low brackish tidal riverbank marsh; saline/brackish intertidal flat; saline/brackish subtidal channel/bay bottom; and tidal creek bottom

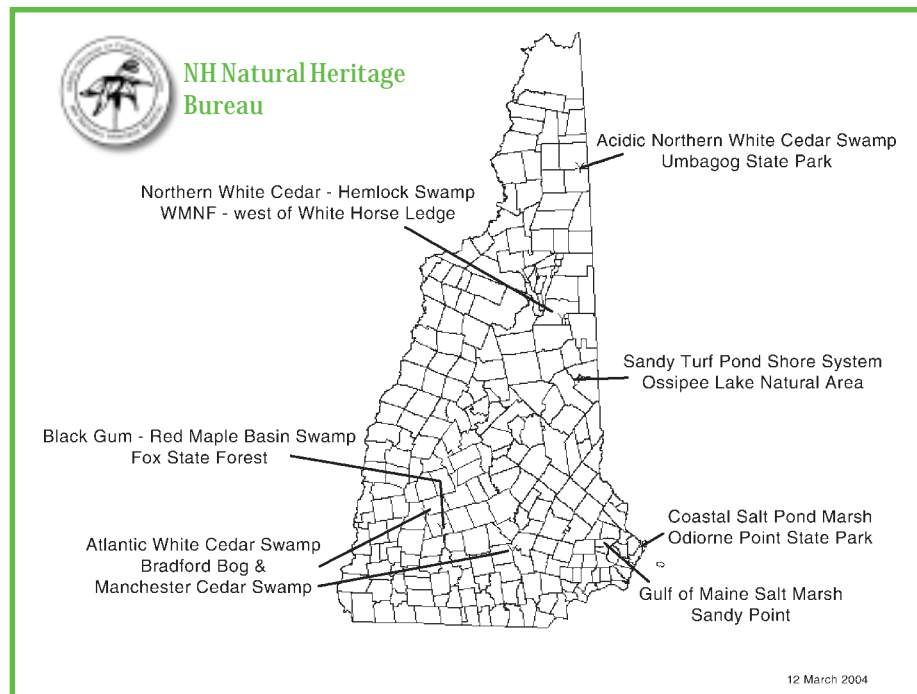
Salt marshes and estuarine intertidal zones are among the most biologically productive systems on earth. They support a vast array of plants and animals, including many species of migratory birds. The vegetation occurs in zones and varies widely depending on how wet and salty each area is. The high salt marsh is at the highest elevation (furthest from the tidal waters), and often has a dense cover of salt meadow cord-grass. A little lower down, where the daily tides reach, the low salt marsh is dominated by smooth cordgrass, which is taller than salt meadow cordgrass (“high” and “low” refer to the height of the land, not the vegetation.) Pannes and pools are other important micro-habitat within salt marshes. These are isolated pockets of shallow water that frequently dry out. The rich mud, especially when covered with salt water, supports few vascular plants but large

COMMUNITIES

numbers of invertebrates. The fish that would otherwise prey on the invertebrates cannot live in these pools due to the frequent drying. Shorebirds, however, can reach the pool and pannes very easily, and they throng there to feed. (*Fact sheet: Gulf of Maine Salt Marshes*)

Odiorne Point State Park – Coastal salt pond marsh

Coastal areas within reach of the sea pose a particular challenge to most plants. Only species with special adaptations can survive in salty areas. This marsh is particularly interesting because the plants in it have to survive in both fresh water and salt: rainfall runoff fills it with fresh water during wet seasons, while salt water gets pushed into the marsh during storms. Moreover, water levels can vary widely during the year, leading to zones of different vegetation within a very small area. Which plants grow where is based on what time of year water is present and how salty it is. The large stands of narrow-leaved cattail and soft-stemmed bulrush grow where the water is seldom salty. Several spike-rush species (including one named “salt-loving spike-rush”) thrive in areas that are submerged in brackish water early in the year, but become exposed when the water



level drops later in the growing season. (*Fact Sheet: Sandy Pond Shores*)



(*Fact sheets with descriptions of community groups can be found on the NH Natural Heritage web site (<http://www.nhdf.org/formgt/nhiweb/>). Detailed descriptions of the natural communities can also be found in: Sperduto, Daniel and William Nichols. 2004. *Natural Communities of New Hampshire*. NH Natural Heritage Bureau and The Nature Conservancy. Concord, NH.*)

Did you know?

New Hampshire has approximately 400,000 to 600,000 acres of nontidal and 7,500 acres of tidal wetlands (6 to 10 percent of the total land area of the state). Dredge and fill projects without a permit are prohibited in wetlands.

Fill is the placement of any material (gravel, grass clippings, soil, brush, etc.) in a wetland or protected area

Dredge is the disturbance or removal of any soil material from a wetland or protected area.

Activities Related to Articles in This Issue

Project WET suggests:

By creating their own soil color chart with crayons, students learn about the properties of wetland soils and attempt to classify them in *Wetland Soils in Living Color*.

The ecological benefits of how wetlands provide flood protection and water storage come alive as students participate in *Capture, Store, and Release*.

In *Humpty Dumpty*, students complete various jigsaw puzzles to understand the challenges of wetland restoration.

Project Learning Tree suggests:

If a duck can paddle in it, it's a wetland. If a duck can waddle on it, it's not. If only wetlands could be defined as

simply as this. In *Watch on Wetlands*, students will learn more about wetlands and how land-use decisions and legislation affect these areas.

The water cycle is the system by which Earth's fixed amount of water is collected, purified, and distributed from the environment to living things and back to the environment. *Water Wonders* will introduce students to the various steps of the water cycle and to the various paths water can take.

In *Rain Reasons*, students will design experiments to see how climatic factors such as rainfall, sunlight and temperature influence the growth and lives of plants. They will use these principles to explore how varying climatic conditions have resulted in an astounding variety of forest types in Puerto Rico.

Project WILD Aquatic suggests:

Through the use of common, everyday objects, students use metaphors to describe the many important functions of wetlands in *Wetland Metaphors*.

While creating a collage of human land use around an image of *Dragonfly Pond*, students have the opportunity to evaluate the effects of different kinds of land use on wetland habitats.

In *Marsh Munchers*, students learn to identify components of a salt marsh food web by using body movement and pantomime to simulate the feeding motions of marsh animals.

By designing fish adapted for various aquatic habitats in *Fashion a Fish*, students are introduced to specific adaptations of fish that help them survive in the habitats in which they live.

ANNOUNCEMENTS

Upcoming Projects Workshops

May 8—joint Project WET, WILD, and Learning Tree at Hubbard Brook Experimental Forest in Woodstock. For more information, contact Nicole Clegg at 271-4071 or nclegg@des.state.nh.us.

June 14-15—joint Project WET and WILD Aquatic at the Interpretive Training Institute at AMC's Pinkham Notch facility. For more information, contact Mary Goodyear at 846-5108 or mgoody@ncia.net.

NH Project Learning Tree's 25th Anniversary

2004 marks the 25th anniversary of NH Project Learning Tree. Keep your eyes open for news of special events and celebrations occurring throughout the state. For more information, contact Beth Lesure at 226-0160 or info@nhplt.org.

Earth & Sky EarthCare Website

Earth & Sky launched their online resource, EarthCare at www.earthsky.org/shows/earthcare. This new resource links the Earth & Sky radio series and features with appropriate PLT activities. EarthCare features stories about conservation and earth stewardship, global climate change, ecosystems, and biodiversity. Information is provided for both educators and students.

Brand new website for K-12 environmental education -- www.ClassroomEarth.org

This website emphasizes many popular and highly regarded environmental education programs available today. It provides profiles, reviews, and useful information on how to obtain materials, training, and more. These programs meet the rigorous "excellence" standards of the North American Association for Environmental Education, adhere to statewide standards of learning in science and social studies and other areas, and are widely available and economically priced.

Teachers needed for development of NH Natural History Unit

The Projects are interested in forming a planning committee to develop a unit for studying the natural history of New

Hampshire. Any educator wishing to be part of the committee should contact Esther Cowles at 226-0160 or esther@nhplt.org.

Esther Cowles, NHPLT, Recognized as NH Environmental Nonformal Teacher of the Year!

Congratulations to NH Project Learning Tree's Esther Cowles who was recently awarded the NH Environmental Nonformal Teacher of the Year award from NH Environmental Educators (NHEE). Esther was recognized for her work in creating supplemental NH-specific educational resources for PLT, developing the Connecting Schools to People and Place program currently being piloted at Woodsville Elementary School, and for supporting the training of over 1,000 NH educators in PLT since 1997.

Other local educators were also recognized with environmental teaching awards co-sponsored by NHEE and Projects WET, WILD, and Learning Tree. John Marshall and Val Ford, a team from Bartlett Elementary School, received the NH Elementary Environmental Teacher of the Year award for their work on a maple sugaring program. Scott Semmens, a biology teacher at Hopkinton High School, was awarded the NH Secondary Environmental Teacher of the Year award for several projects he does with his students including vernal pool investigations and White Mountain snow acidity research.

All of the award winners will also be recognized at this year's NH EDies awards on Sunday, June 6. We extend our congratulations to them all!

Community Mapping

A 13-day course for educators interested in exploring local natural resources using Geographic Information Systems (GIS) technology. The course combines learning about natural resources management and planning with developing skills in using ArcView GIS software. Dates are June 3, July 6-9, 12-16, and 19-21 in Manchester. For more information, contact Cooperative Extension at 862-1029 or gis@unh.edu. Cost ranges from \$450 - \$640 depending on credit/non-credit and NH residency.

Watershed Ecology Summer Institute

Join us for this ten-day class for educators (July 26 to August 6) at Bow High School. Learn how to use watersheds as a framework for studying wetlands, rivers, streams, lakes, and more. Participants receive curriculum materials and classroom activities. For more information, contact Aquatic Education at (603) 271-3212.

Register for the 2004 Coastal Cleanup

Looking for a volunteer opportunity for your class? Participating in the annual Coastal Cleanup is a great way to get your students involved in their community. Volunteers are currently being sought for the 2004 cleanup scheduled for Friday, September 17, 2004, at various beaches along New Hampshire's seacoast. For more information, contact the NH Coastal Program at 271-2155.

2004 New England EE Conference in Vermont

Reserve the weekend of October 15-17, 2004 for the 38th annual New England Environmental Education Alliance conference at the Breadloaf Campus of Middlebury College in Ripton, VT. The event offers numerous EE-focused workshops and networking opportunities. Visit <http://www.neeea.org> this summer for registration information.

WOW! The Wonders of Wetlands Educator's Guide

This comprehensive K-12 guide is part textbook and part activity guide. The first 70 pages features background material in six chapters focusing on

- Wetlands and people
- Wetland definitions
- Wetland functions
- Wetlands as home to animals and plants
- Wetlands management
- Wetlands protection

This material is followed by more than 40 wetlands activities to investigate not only the plants, animals, water, and soils that make up wetlands but also the interactions between wetlands and people and wildlife and what this means for their future. The guide also contains ideas for wetland enhancement projects and actions that we can all take to help protect wetlands. WOW! The Wonders of Wetlands is available from Project WET at www.projectwetusa.org.

ON THE H.O.M.E. FRONT

Waterscaping for Wildlife

BY MARILYN WYZGA

Just add water, and invite a world of diversity into your schoolyard. At the Fish and Game Department in Concord, we built a rubber lined pond that attracts water striders, diving beetles and several varieties of frogs, plus dragonflies that perch on potted pickerelweed. Fox, deer and turkey stop by to drink and songbirds bathe in the shallows.

Water is the essential habitat ingredient most often missing from our developed landscapes. If your site is graced with one of the state's many water bodies or courses — a pond, stream, lake, vernal pool, bog, river or marsh — you may not need to enhance your site for water. If, instead, your site has no wet areas, a water source such as a small fabricated pond or bird bath set on the ground will benefit a variety of wildlife from birds to butterflies to frogs. A pond can shelter small fish, aquatic insects and other amphibians like toads and salamanders, and provide them a place to breed. Water sources for wildlife should be clean and accessible to other habitat components such as food and cover or shelter.

Directions for building a pond can be found in many wildlife landscaping books, including:

Water Gardens, Expert Advice and Practical Instructions and Ideas for the Most Beautiful Streams, Pools and Water Gardens, Peter Stadelmann, 1992 by Barron's Educational Series, Inc. Hauppauge, NY

Waterscaping: Plans and Ideas for Natural and Created Water Gardens, Judy Glattstein, Storey Books, Pownal VT 1994



LIZA POINIER PHOTO

Fish and Game's water garden is framed by a meadow habitat and stone wall and features native wetland plants.

You can also use a pre-formed plastic shell from a home building supply store. For under \$100, you can have a pond with a pump.

Our pond was built by Jeff Crary of Center Barnstead's Crary Waterfalls and Aquatic Nursery. A hole was excavated and leveled, then lined with a 3 mil rubber sheet. Because our office building is on former pine barrens — a sandy glacial deposit — the soil is uniform, easy to dig and free of rocks. A filter network system of slotted 4" PVC pipe was laid on the liner, then topped with 6" of rounded pea stone. Large rocks form a perimeter; where they emerge from the water, they provide landing pads for insects and birds, and places for frogs to sun and rest. An electric pump circulates the pond's 1,000 gallons, which drops over two waterfalls into the deepest pool.

No pond should be an island. Including plants for cover and food in the surrounding area is essential to building good wildlife habitat. The aquatic plants we selected for our pond are mostly native to the northeast, and include pickerelweed, water lily, iris, monkey flower and arrowhead. A rotting log shelters small mammals and amphibians. Various trees, shrubs, ground covers and perennials connect the pond to the surrounding woodland.

Over-nutrition can be a difficult issue

for ponds. We have had some success with barley straw for keeping the algae in check. We opt to skip fish for a variety of reasons. The pond freezes to its bottom liner in winter, which would not be happy circumstances for fish. Hosting larger wildlife like fish adds their larger waste loads to the system, encouraging algae growth. Be sure to keep the pond regularly cleaned, to discourage algae from growing (which can be harmful to the birds) and mosquitoes from laying eggs. A circulating pump in a pond, no matter the size, will serve the same purpose.

Clean or empty birdbaths, or other sources of standing water, at least weekly to eliminate the likelihood of mosquito larvae development during the breeding season. Weekly cleanup is not necessary if water is being pumped and circulated through a water feature.

Over time, you will gradually notice organic matter such as leaves and small plant parts, accumulating on the bottom of the pond. This creates a microhabitat that is occupied by aquatic insects or other organisms. If you leave it there, it will simulate conditions in a natural pond. Overall, the goal is to allow the water garden to become a balanced, self-contained system. We leave the bottom layer and scoop the excess.

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A small water feature on the ground benefits wildlife that can't fly in. A salamander would be vulnerable shimmying up a birdbath pedestal, and a tree frog might not have enough cover once it's in the basin. While a chipmunk could hop down from a nearby stonewall, a toad would be hard pressed to jump 2 feet off the ground. You can purchase a bird basin without a pedestal and place it in a shallow depression on the ground, or even use a trash can lid. Surround the edges with small rocks to simulate a tiny pool, and plant it with ferns and groundcovers to provide creatures safety from predators. Protect birds from cats by providing high cover that the birds can escape to, and no intermediate cover that a cat can hide in.

For curriculum connections, students can practice math skills by measuring pond perimeters or calculating volumes. Social studies skills could be exercised in mapping an area to build a new pond, or mapping the area of an existing pond, using a grid. Students could apply scientific process skills in observing wildlife activity around the pond, and language arts in writing about what they observe, or art to illustrate their observations.

Vernal Pool Essentials

Put on your rubber boots and find a temporary spring pond to explore. It doesn't take fancy equipment, rather just you and your students' curiosity. Imagine discovering with your students a large gray-black salamander with bright yellow spots or a black masked frog that quacks like a duck. Vernal pools are home to creatures with life stories that will amaze and inspire you.

To get yourself excited and informed about these remarkable temporary spring puddles, visit <http://www.vernalpool.org>, a website designed and developed by the Reading Memorial High School students' Vernal Pool Association and their teacher Leo Kenney. This website will show you how powerful and motivating the study and protection of vernal pools can be for students of all ages. Also check out the following Leo Kenney publications: *A Field Guide to the Animals of Vernal Pools*

and *Diving Into Wicked Big Puddles: A Vernal Pool Resource Kit for Educators*. A couple of other essential reads for vernal pool explorers are Tom Tynning's excellent *Stokes Nature Guide to Amphibians and Reptiles* and the children's book *Spring Pool: A Guide to the Ecology of Temporary Ponds* by Ann Downer.

But the best way to fall in love with vernal pools is to put on your raincoat, slide into your rain boots, grab your headlamp, and head out on the first few rainy nights this spring above 50 degrees. Listen for the wood frogs' quacking song and watch the spotted salamanders courtship dance.

Contact your local Conservation Commission to find out where these amazing "wicked big puddles" are in your neighborhood.

— Susan Denehy, Harris Center



Even if it's as simple as a cache pot with a single water loving plant in it, the fastest, easiest way to introduce an entirely new world of plant diversity into your schoolyard site is to add water.



Save the Date...

October 22, 2004 –
PLT Silver Jubilee Celebration

Coordinator Information

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